

PROCEEDINGS OF THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON

SERIES C. JOURNAL OF MEETINGS

VOLUME 21.

No. 11, 1956

REPORT OF THE COUNCIL, 1956

On 31st December last, the number of Fellows of the Society stood at 1220, showing a net increase of 47 (35)* for the year. It is gratifying to know that this important index of the Society's well-being has shown a steady increase for the last eleven years. The increase of 47 for the year resulted from the election of 96 (98) Fellows, of whom 64 completed their obligation by 31st December. In addition, 22 new Fellows elected in 1955 completed their obligation in 1956, making a total of 86 new Fellows. Against this number, the Society lost 39 (45) Fellows during the year, 9 (16) by death, 13 (18) by resignation and 17 (11) by the operation of Bye-Law XVI (3).

The Society has lost by death two Honorary Fellows (H. Weber and E. A. Cockayne) and 7 Ordinary Fellows: Miss K. O. V. Lieu, G. Newland, K. L. Palmer, W. H. Richardson, P. C. Singha, B. B. Snell and J. N. Thornton.

The following Fellows have resigned: J. F. Burton, L. C. Bushby, K. S. Dickinson, W. J. Ferrier, H. Hacker, H. S. Hanson, R. U. Hingorani, F. F. Laidlaw, W. Marr, W. E. S. Merrett, R. C. Muir, P. B. Stones and H. R. Wallace, while the following have been removed from the List of Fellows in accordance with the Bye-Laws, Chapter XVI, section 3: L. Berner, J. H. Cater, T. D. Goddard, R. S. Hanoman, J. S. Harrington, G. S. Harrison, M. M. Hosni, Mrs. G. B. Hudson, M. Hussein, Miss B. K. Macpherson, W. J. Perry, P. L. Renjhen, B. K. Sinha, N. Slater, A. B. Taylor, P. M. Thomas, K. P. Whitehorn.

Ten Ordinary Meetings were held during the year. The average attendance at these meetings, at 85, was appreciably lower than the 95 of the previous year. Attendance in the summer months was higher than in previous years, but has fallen off considerably in the autumn. This decline was presumably due to the shortage of petrol. Advance notice of the subjects of papers to be given at forthcoming meetings is now given in *Proceedings Series C*, with the object of assisting those who come from a considerable distance and are unable to attend all meetings. Arrangements have been made to provide refreshments in the Library after the Ordinary Meetings.

The Society's publications during the year comprised 1256 pages. Volume 108 of the *Transactions* amounted to 585 pages and included 11 papers, with four half-tone plates and numerous text figures. The Society is indebted to the Royal Society for a contribution from the Government Grant-in-Aid of Scientific Publications, which covered the cost of Dr. Lindroth's paper; to the University of Malaya and the Colonial Development Fund for generous assistance towards the cost of the paper by D. H. Colless and to the Anti-Locust Research Centre for a contribution towards the cost of publishing the paper by Dr. Dirsh.

* The numbers in brackets are the corresponding figures for the previous year.

Proceedings Series A Volume 31 was made up of 185 pages, comprising 29 papers illustrated by two half-tone plates and numerous text figures. *Proceedings Series B* Volume 25 includes 220 pages, with 41 papers, illustrated by three half-tone plates and many text figures. *Proceedings Series C* has been sent in parts to every Fellow in advance of meetings and a complete copy will be sent with the last part.

New editions of two parts of the *Handbooks for the Identification of British Insects* have been published. These are Volume I, part 5, Dermaptera and Orthoptera, by W. D. Hincks, and Volume I, part 10, Odonata, by F. C. Fraser. In addition, three new parts of the *Handbooks* have been published. These are: Volume IV, part 1, Coleoptera: Introduction and Keys to Families, by R. A. Crowson; Volume VI, part 1, Hymenoptera: Introduction and Key to Families, by O. W. Richards; and Volume V, part 11, Coleoptera: Scarabaeoidea, by E. B. Britton. Three other parts of the *Handbooks* series, Siphonaptera; Coleoptera: Pselaphidae; and Hymenoptera: Belytinae, are now in the press and will be issued in the early part of this year. A total of 20 parts has now appeared. It is gratifying to be able to report that sales of these parts are considerable, so that funds for the publication of new parts are assured.

It has been decided to start a series of *Special Publications*, or *Memoirs*, to appear at irregular and perhaps fairly long intervals, which will be devoted to longer works of wide interest as these become available. These will not be distributed free, but, like the *Handbooks*, will be available at a reduced rate to Fellows. By this means it is hoped that these works will finance themselves by maintaining a revolving fund.

The other main activity of the Society, the Library, shows a welcome increase in activity, with a rise in the number of loans from 1604 in 1955 to 1729. The number of borrowers was 885 (851). 115 (105) loans were made to the National Central Library.

The Librarian has made good progress with the cataloguing of separates, and a microfilm copy of the 60,000 cards in the catalogue has been made and is being deposited at the Society's bank. Insurance of the Library has been increased by 50 per cent. During the year, one of the rooms on the second floor has been furnished as an extension of the main Library and has made possible the much-needed expansion of the available shelf space. A very necessary improvement in the lighting in the Library has recently been undertaken. Two journals, on subjects outside the Society's field, have been sold, with consequent benefit to the Library Fund and the freeing of needed shelf space. Notable accessions to the Library include a number of very rare works which were purchased from the library of Dr. A. A. Lisney. The Council is grateful to the many Fellows who have presented separates of their papers, and other works, to the Library. Separates are of considerable use to the Society, as there has been a very serious increase in the cost of postage on books, so that whenever available separates of the papers needed are sent to borrowers.

The Finance and House Committee, under the Chairmanship of Dr. K. Mellanby, and the Publication and Library Committee, under Mr. Paul Freeman, have continued to meet. Council wishes to record its thanks to Dr. Mellanby and Mr. Freeman and to the members of the Committees for their valuable work on behalf of the Society. The Committee for the Protection of British Insects has not met, as no business has arisen. Council wishes, however, to point out that the Committee has accomplished useful work in past years and is still in being, so that if any Fellow knows of any case where the existence of a British species is threatened, it should be reported.

The benefit resulting from the increase in office and Library accommodation which has been acquired by the Society is now fully appreciated, the more so as it was possible to carry out the complete redecoration of the Society's part of the house during the spring. For the first time for many years it has been possible to store all the Society's stock of publications in the house. This has made it possible to arrange the stock so that orders for back numbers can be met with greater speed. The subjects and artists of the oil paintings in the Society's possession have now been identified and plaques giving these details have been attached to the pictures.

The Society's office was able to give valuable assistance to Fellows and other entomologists who travelled from this country to Canada for the Tenth International Congress of Entomology, in making travel arrangements and in simplifying negotiations with the Bank of England for the supply of currency. As a result, 38 entomologists travelled to Montreal in the same ship, an arrangement which, it is believed, proved highly satisfactory to all concerned.

No changes were made in the delegates of the Society to permanent outside organisations. The Society was represented at the Tenth International Congress of Entomology at Montreal in August by the Secretary, and by Mr. W. V. Harris and Dr. H. E. Hinton. Representatives to the British Association Meeting were Mr. P. F. Mattingly and Mr. J. Balfour-Browne. Mr. N. D. Riley was appointed to represent the Society on the Linnean Society's Programme Advisory Committee, the purpose of which is to plan meetings and discussions on subjects of broad biological interest.

A message of greeting was sent by the Society to the Deutsche Entomologische Gesellschaft on the occasion of the centenary celebrations in October of the foundation of that Society.

In conclusion, the Council feels that the past year may be recorded as one of steady if not spectacular progress. It must be a source of satisfaction to all that, in spite of the considerable rise in costs since 1948, the Society has been able to maintain and even to raise the level of its activities without a corresponding increase in the rate of the Fellows' subscriptions.

TREASURER'S REPORT

It is again my privilege to report to you on the accounts of our Society. Before you are the accounts and balance sheet for the year ending 31st December, 1956. They have been audited and certified by our auditors, Messrs. W. B. Keen & Co.

1956 was the first full year for the new arrangements of increased accommodation for our Society, but I am glad to be able to report that this has been accomplished with a decrease of only £14 in receipts from rent. I should like to remind Fellows that it was in 1955 that the special volume of *Transactions* in honour of Dr. Jordan was published and increased receipts were obtained from its sale; it is not surprising, therefore, that in our General Fund for 1956 the income of £10,620 is less than in 1955, when it stood at £11,299.

I must point out at once that the decrease in the capital turnover of our General Fund which has been shown is by no means indicative of a decrease in our activities, as you will presently hear when our Special Funds, Handbooks, Library and Repairs and Improvements are reviewed.

I regret to say that some substantial part of our income—about £280—in respect of income tax recovered on account of covenanted subscriptions, is awaiting a decision on appeal in the Courts with regard to covenanted subscriptions for the National Book League. I have been informed that similar claims have also been held up pending this decision. Thus, income which amounted to £263 in 1955 is therefore not included in our income.

Income from subscriptions, however, which was £3254 in 1955, increased to £3374 in 1956. Interest on investments in respect of the Hugh Main Fund has increased by £90.

We obtained £4661 from the sale of our *Transactions* and *Proceedings* during the year; it was £5017 in 1955 but I must repeat that in 1955 we did publish the special volume, and if we ignore receipts from the sale of the special volume, sales from this source show an increase. £4661 is a very substantial amount and I think the thanks of all Fellows are due to the Editor and our staff for coping with such an amount of work.

With regard to expenditure, it seems inevitable these days that each item must show an increase, but I am sure Fellows will agree that the high standard of economic housekeeping which we have learnt to expect from our Registrar has been well maintained. Our total expenditure on printing in 1956 was greater than in 1955, but that concerned with *Transactions* and *Proceedings* in 1955 was £6682; in 1956 it was £5814. At this point I would like to draw the attention of Fellows to the now extremely high cost of distribution of these publications, due to the increased postal rates. In addition, an increase of 20 per cent. in printing costs which we had to bear during the year was not passed on to subscribers.

You will already have heard from the report of Council concerning special publications which are envisaged, and your Finance Committee have been asked to investigate the financial implications of starting a series. I am glad to say that it has been possible to transfer £500 to the Special Publications Fund.

In the General Fund the excess of income over expenditure for the year is £91.

I should tell you something of our Library Fund. New books have cost £562 during the year—almost double the amount spent in 1955. However, those of you who study the Additions to Library printed with the agenda will know that we have purchased books during the year of outstanding merit and value, and we have had some good bargains. Binding, repairs and insurance have also cost considerably more than in 1955. This means that we have in this Fund an excess

of expenditure over income for the year of £176. All Fellows of our Society are rightly proud of our Library—culturally of great national importance—and Fellows will be interested to know that it is valued for insurance purposes at £33,000.

In our Repairs and Improvements Fund we have, during the year, spent £739, mainly on the extensive redecoration which were carried out. This was considerably less than the £1321 spent during 1955, but this has caused an excess of expenditure over income of £289 over the year. It has been possible to allocate £450 to this Fund.

Handbooks of British Insects Fund.—Again an excess of expenditure over income for the year is shown, this time £497. 1956 saw a high proportion of work by our staff, stationery and expenses allocated to *Handbooks of British Insects* and it was thought that the sum of £400 should rightly be allocated to this expenditure.

Actually our sales of *Handbooks* for the year of £1060 is approximately equal to the cost of printing but the £400 just mentioned is sufficient to give us in this Fund a large excess of expenditure over income. Five *Handbook* parts were published or reprinted during the year, several in December, and I am pleased to say that our current income from their distribution is very satisfactory.

In conclusion I would like to point out to you the extent of our Reserve and Trust Funds. Our Capital Reserve Fund stands at £9778, but no figure is included for the value of our premises, 41 Queen's Gate, the cost of which, with all alterations, amounts to £13,417.

The "Hugh Main Fund for the Advancement of Entomology" consists of investments valued at £12,606 and our two Trust Funds, including the Hamilton Druce bequest and the Westwood bequest, stand at £1345

How very fortunate is our Society in possessing these funds, which function as a great stabiliser in our affairs.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON
STATEMENT OF INCOME AND EXPENDITURE for the Year ended 31st December, 1956.
(Presented at the Annual Meeting, 6th February, 1957.)

INCOME.		EXPENDITURE.	
1955.	1955.	1955.	1955.
£	£	£	£
To Subscriptions—	By House Expenses—		
Received in Advance for 1956 ..	Wages ..	508 12 0	
Received in 1956 for 1956 ..	Superannuation Contributions ..	34 14 2	
Received in 1956 for previous years ..	Fuel, Gas and Electric Light ..	206 15 0	
	Insurance ..	79 8 0	
3,547	Water ..	38 13 6	
Less Subscriptions in arrear at 31st	Repairs and Improvements Fund—		
December 1955 valued at ..	Transfer ..	450 0 0	
	Miscellaneous ..	114 5 3	1,432 7 11
3,422			
100	Office and Meeting Expenses—		
3,522	Salaries ..	2,037 3 8	
Income Tax Recovered in respect of	Superannuation Contributions ..	149 15 2	
Covenanted Subscriptions ..	Printing and Stationery ..	121 1 10	
Transfer from Capital Reserve Fund ..	Postage and Telephone ..	201 10 2	
Interest on Investments (gross) ..	Office Equipment ..	—	
Transfer from Hugh Maip Fund ..	Legal Expenses ..	—	
Interest on Investments (gross) ..	Audit Fee ..	63 0 0	
Publications—	Miscellaneous ..	188 13 2	
Sales ..		2,761 4 0	
Transfer from Library Fund—	Less Proportion of Salaries,		
Value of Exchanges ..	Stationery and Postage allocated		
	to <i>Handbooks of British Insects</i> ..	400 0 0	2,361 4 0
Sub-Tenants—	Library Fund—		
Rent ..	Transfer ..	697 11 1	
Contributions to House Expenses ..	Ditto Value of Exchanges ..	525 0 0	1,222 11 1
Interest—Post Office Savings Bank ..	Publications—		
Bequest by the late Mrs. I. M. T. Welti ..	Expenditure ..	5,814 13 5	
Miscellaneous Receipts ..	Less Grants and Dona-		
	tions ..	820 0 0	
	Transfer from Special		
	Publications Fund ..	—	
	Westwood Bequest ..	14 7 8	
		834 7 8	4,980 5 9
	Donations—		
	<i>Zoological Record</i> ..	25 0 0	
	International Trust for Zoological		
	Nomenclature ..	5 0 0	
	Wicken Fen Fund ..	—	
	British Co-ordinating Committee for		
	Nature Conservation ..	3 0 0	
	World Health Organisation ..	—	
		33 0 0	
	Transfer to Special Publications Fund		
	Excess of Income over Expenditure for		
	year carried to Balance Sheet ..	500 0 0	
		91 5 4	
			£10,620 14 1
11,299			

STATEMENT OF INCOME AND EXPENDITURE for the Year ended 31st December, 1956.

[illegible]

INCOME.			EXPENDITURE.		
1955	£	s. d.	1955.	£	s. d.
To General Fund—Transfer	1,200	—	By Repairs and Improvements	1,321	—
„ Amount recoverable from Sub-Tenants in respect of	—	—	„ Excess of Income over	395	—
Diapitations	516	—	Balance Sheet	—	—
„ Excess of Expenditure over income for year carried to	—	—			
Balance Sheet	—	—			
	£1,716			£739	1 10

SPECIAL PUBLICATIONS FUND.		
1955.		
INCOME.		
£	s.	d.
£	500	0 0
500	0	0
£500	0	0
EXPENDITURE.		
1955.		
£		
By Transfer to General Fund		
500	0	0
" Excess of Income over Expenditure for year carried to Balance Sheet		
500	0	0
£500	0	0

HANDBOOKS OF BRITISH INSECTS.			
INCOME.		EXPENDITURE.	
1955	£	s.	d.
£ 470	To Sales	1,060	9 4
—	„ Excess of Expenditure over Income for year carried to
—	„ Balance Sheet
£470		497	9 4
		£1,557	18 8
		£1,557	18 8

BALANCE SHEET, 31st December, 1956.

TRUST FUNDS.

	£	s.	d.	£	s.	d.
HAMILTON DRUCE BEQUEST FUND— As at 31st December, 1955	1,095	15	6
HAMILTON DRUCE BEQUEST— Investments— £406 2s. 2d. Mersey Docks and Harbour Board 3½% Debenture Stock 1970/80 at cost £593 17s. 10d. Ditto, transferred from Capital Reserve Fund in 1946 at Market Value £66 12s. 9d. 3% War Stock at cost (Market Value at date £749.)	418	11	6
				610	4	6
				66	19	6
				1,095	15	6
WESTWOOD BEQUEST FUND— As at 31st December, 1955	250	0	0
WESTWOOD BEQUEST— Investment at cost— £239 12s. 4d. Birmingham Corporation 3% Stock 1947 (Market Value at date £139.)	250	0	0
				£1,345	15	6

(Sgd.) N. E. HICKIN, *Hon. Treasurer.*

We have examined the foregoing Balance Sheets and Accounts with the books and vouchers of the Society and certify them to be in accordance therewith. We have verified the Investments and Bank Balances, and the Solicitors have certified to us that they hold the Deeds of No. 41, Queen's Gate for safe custody on behalf of the Society.

*Finbury Circus House,
Blomfield Street,
London, E.C.2.
25th January, 1957.*

(Sgd.) W. B. KREN & CO.,
Chartered Accountants.

THE COMMITTEE FOR THE PROTECTION OF BRITISH INSECTS.

RECEIPTS AND PAYMENTS ACCOUNT for the year ended 31st December, 1956.

RECEIPTS.		PAYMENTS.	
To Balance at Bank 1st January, 1956	£ s. d. 24 11 10	By Balance at Bank 31st December, 1956..	£ s. d. 24 11 10
	£24 11 10		£24 11 10

(Sgd.) H. M. EDELSTEN, Hon. Treasurer.

We certify that we have verified the Balance at the Bank.

*Finsbury Circus House,
Blomfield Street,
London, E.C.2.*

25th January, 1957.

(Sgd.) W. B. KEEN & Co.,
Chartered Accountants.

THE ROYAL ENTOMOLOGICAL SOCIETY WICKEN FEN FUND.

RECEIPTS AND PAYMENTS ACCOUNT for the year ended 31st December, 1956.

[illegible]

(Sgd.) H. M. EDELSTEN, Hon. Treasurer.

We have audited the above account of Receipts and Payments and certify it to be correct.

*Finsbury Circus House,
Blomfield Street,
London, E.C.2.
25th January*

(Sgd.) W. B. KEEN & Co.,
Chartered Accountants.

THE PRESIDENT'S REMARKS

LADIES AND GENTLEMEN.

Before proceeding further, it is my duty to refer briefly to those Fellows who have passed away during the past year. As you will have heard from the Report of the Council, the toll has been lighter than in some previous years, but we have lost two Honorary Fellows and seven Ordinary Fellows.

EDWARD ALFRED COCKAYNE was born in 1880 and died on 28th November, 1956. He was elected to the Society in 1904 and made an Honorary Fellow in 1948. He served four periods on the Council and, in addition to being Vice-President in 1927 and 1939, he was President in 1943-44.

Cockayne was eminent in the field of medicine but, apart from his medical activities, entomology was his absorbing interest and he made a special study of the biology, variation and genetics of the British butterflies and moths. In 1947 he presented his valuable collection of some 50,000 selected specimens to the Trustees of the Natural History Museum and he was invited to amalgamate it with the existing British collections, including that of the late Lord Rothschild. For this purpose, he worked in the Zoological Museum at Tring and, from all this mass of material, he created a collection showing not only the complete known range of variation within each species but all that is known of their genetics. He also purchased at his own expense rare and historical specimens and attracted valuable donations of material from private collectors. The final result is a collection so arranged and displayed as to be of the greatest interest to collector and scientific student alike. He was indeed a noteworthy benefactor to the collections of the Natural History Museum. His services to entomology were recognised by the award of an O.B.E. in 1954.

Many of you will remember Cockayne and recollect how generous he was as a personal friend but, quite rightly, he never allowed personal friendship to sway him when principles or fact were involved.

I have heard only to-day that under the terms of Dr. Cockayne's will a sum of £1000 and a selection from his library has been left to the Society.

HERMANN WEBER was born on 27th November, 1899, and died in November 1956. He was elected an Honorary Fellow of the Society in 1937. Professor Weber was a distinguished zoologist with an international reputation, having been in turn Professor and Director of the Zoological Institute of Danzig, Münster, Vienna and Strasburg. At the time of his death he was Professor of Zoology and Director of the Zoological Institute in the University of Tübingen.

Professor Weber will be particularly remembered for his work on the biology of the Hemiptera, on which he published a book in 1930, and several later works devoted to their morphology and development. He also published a *Textbook of Entomology* in 1933 and a *Fundamental Outline of Entomology* in 1938, a third edition of which appeared in 1954.

Professor Weber was a corresponding member of the Academy of Science in Vienna, the Zoological and Botanical Society in Vienna, the Zoological Society of India and the American Entomological Society. He was awarded a Fabricius medal by the German Entomological Society.

KENNETH L. PALMER died on 18th January, 1956, at the age of 67. He was elected a fellow of the Society in 1931. An engineer by profession, he collected butterflies and moths from boyhood, amassing a very extensive collection until he was unable to set and mount his specimens any longer on account of ill health. Palmer was much interested also in bee diseases, mange mites, and mites and other

parasites of wild birds and animals, both wild and domestic. He also studied British birds and was a keen aquarist, breeding many varieties of tropical fish. He was clearly a gentleman of very wide interests.

Prakash Chand Singha died in December 1955 at the early age of 31. He was elected to the Society in 1954. After a period as a lecturer in Horticulture in Bengal and as an officer in the Agricultural Department of the Central Government, he devoted his attentions to apples and became a prominent apple grower in the Simla Hills. He was much interested in the pests and diseases of apple trees and at the time of his death he was studying pests and diseases attacking the different varieties at high altitudes and in particular he was carrying out experiments on a root borer of apple trees.

Basil Bassett Snell was born in 1905 and died on 18th January, 1956; he was elected to the Society in 1945. Snell was a Company Director by profession who was a keen amateur Entomologist. His special interest was the Lepidoptera and in particular the genus *Eupithecia*. His collections were left to the Lancashire and Cheshire Entomological Society. Snell was also a very keen bridge player and had represented Cheshire County.

Joseph Norman Thornton was born on 13th June, 1892, and died on 8th August, 1956. He was elected to the Society in 1946. A senior Transmission Engineer of the Central Electricity Board, he was an amateur entomologist who made a general collection of insects, more particularly of Yorkshire, North Wales and Hampshire. His collections have been left to the Leeds Museum. He was a member of the Chester Natural History Society.

Of Miss K. O. Victoria Lieu, Mr. Gordon Newland and the Rev. W. H. Richardson, I have no details. Professor Lieu was a professional entomologist who worked in the United States and China. She was elected to the Society in 1946. Mr. Newland and the Rev. Richardson were amateurs who were elected to the Society 33 and 34 years ago respectively.

Although he was not a Fellow at the time of his death, I feel sure you would expect me to make a short mention of Brigadier William Harry Evans because he was a Fellow of the Society for many years and at one time was its Hon. Treasurer. During his long and eminent service with the Army in India, Evans collected butterflies assiduously, subsequently presenting his entire collection to the Trustees of the British Museum. After his retirement in 1931, he devoted himself to a taxonomic revision of the Hesperiidæ of the world and the results of his work have been embodied in a series of publications issued by the Trustees of the Natural History Museum. These publications form a basis on which future research can develop for many years. The Brigadier left a host of friends in this country and abroad who will feel his loss for a long time to come.

May I ask you to rise and stand a moment in memory of these friends and colleagues who are no longer with us.

You will have heard the reports of Council and the Hon. Treasurer and I do not think they call for any special comment from me. There is, however, one point to which I should like to refer. It is with very great regret that we have learnt that Mr. Balfour-Browne finds it necessary to relinquish his duties as Editor. Mr. Balfour-Browne has shouldered the editorship—very ably assisted by our Registrar, Miss Evans—for the past five years. You will have heard from Council's report that the Society's publications during the year comprised 1256

pages and those of you who have had editorial experience will realise what an immense amount of work that has involved. No Editor could have been more conscientious in his duties than Mr. Balfour-Browne and we owe him a very special debt of gratitude for all his hard work and for the high standard of the Society's publications that he has maintained.

I welcome this opportunity of expressing my personal thanks to the Honorary Officers and the Society's staff. Their efficiency, and the unfailing kindness with which they have treated me, has made my term of office easy and extremely pleasant. They are a grand team and they have indeed served the Society well. I hope that later in our proceedings some Fellow will give formal expression of our gratitude to them.

May I also take the opportunity of thanking you for the honour you have done me in allowing me to be your President for two years and may I extend my very best wishes to Professor Richards—your incoming President—for an equally enjoyable term of office.

**Presidential Address to the Fellows of the
Royal Entomological Society of London delivered by**

W. J. HALL, C.M.G., M.C.

**at the Annual Meeting on Wednesday,
6th February, 1957.**

I have been in some difficulty to decide on the subject of my address this evening because for the past 10 years or so I have been a back-room boy and not directly engaged in any entomological research.

My main preoccupation during the 23 years of my service overseas was in economic entomology, seven years in Egypt and 16 years in Southern Rhodesia. Throughout this period I also indulged in a little taxonomic work which I continued for three years after I returned to this country. For the past 10 years or so my duties have been largely administrative but, as Director of the Commonwealth Institute of Entomology, I have been responsible for an information centre involving bibliographical work and the determination of insect material. So one way and another my experience has been somewhat of the mixed grill order.

It so happens that the period of my active service in the entomological field, from 1919 to date, has coincided with revolutionary changes that have taken place in the development of our science. It is with certain aspects of this development that I should like to deal very briefly this evening.

The subject of my address then is :—

THE BALANCE OF EFFORT IN ENTOMOLOGY

It is probably not untrue to say that for a century and a half prior to 1914 the science of entomology developed along somewhat leisurely lines. Taxonomy claimed by far the most attention but during the latter part of the period the studies of biology, insect physiology, and particularly economic entomology, were developing rapidly.

The urgent need to increase the production of food and raw materials during the First World War greatly stimulated work in the field of economic entomology, especially in this country where we had lagged far behind the United States and some other countries; the National Agricultural Advisory Service was established and much work on problems of an economic nature was initiated in the various Research Stations and Universities throughout the country.

Between the wars, the study of economic entomology proceeded apace all over the world and it was inevitable that, in a subject that was developing so rapidly, workers should become more and more specialised.

The Second World War had an even more profound influence than the first, in view of the vital necessity to protect and augment world crops. The need to protect troops from insect-borne diseases also assumed great importance. It was during this war that the first of a wide range of new and highly toxic chemical compounds was discovered and heralded a revolution in the control of insect pests by insecticidal measures, applied not only from the ground but also from the air. The fact that very small quantities of a highly toxic insecticide are sufficient to enable large areas to be treated has led to a great increase in attempts to control insects from the air. It has been reported for instance (Hurtig, Fettes, Randall and Hopewell, 1953) that as little as one-fifth of a gallon of D.D.T. per acre has

proved effective in Canada against the spruce bud worm. Up to recent years, insecticides were usually applied from the air in the form of dusts, but the speed with which aerial spraying is developing may be judged from the fact that in the United States, according to Messenger, the ratio of aircraft sprayers to dusters rose from 1 to 15 in 1946 to parity in 1949 (Messenger, 1949).

The use of aircraft for insect control has produced its own crop of problems but it has great advantages for certain types of work and, rather than decry the method for some of its present obvious and well-known disadvantages, the problems involved should stimulate research leading to their solution. The need for this will be apparent from the estimate (Ripper, 1955) that, excluding the U.S.S.R., of the 100 million acres in the world that were sprayed or dusted in 1954, 10 million acres were treated from aircraft.

Whilst the chemists have enabled us to make great strides in the control of many insect pests, the new range of chemicals that they have evolved has at the same time produced many new problems. The widespread use of DDT, for instance, has led to serious trouble from mites and the application of some of the newer insecticides has been quickly followed in some cases by the development of resistance.

The study of entomology to-day falls into many categories, each of which has its specialists, and the tendency is for specialisation even within a given field to increase. We have taxonomists, insect physiologists, biologists, chemists, physicists, and finally economic entomologists who may specialise in crop and orchard pests, forest insects, insects of medical or veterinary importance, pests of stored products, locusts, insecticides, the control of insects from the air and so on. Each of these fields has its own group of specialised workers and yet all the fields are interdependent. It is inevitable that a change of circumstances such as is brought about by war or the discovery of a new range of insecticides should greatly stimulate work in certain fields and this tends to upset the balance of the subject as a whole. Advances in one field can only be maintained if corresponding advances are made in others. Fortunately, research has been stimulated to this end in many directions. It will be sufficient to quote just one or two examples. Insect physiologists have been quick to investigate the factors responsible for the resistance that certain insects have developed to some of the newer insecticides, in an attempt to reach a better understanding of how resistance may be overcome or avoided. Apart from the question of resistance, however, the action of these same insecticides has enabled a new approach to be made in the study of physiological processes in general. A wider knowledge of these processes, and in particular in respect of those insects with which the economic entomologist has to deal, is bound to have far reaching effects of a beneficial nature. The application of some of the newer insecticides from aircraft has raised a wide range of problems in the physical field, such as the optimum size of droplets under varying conditions of vegetational cover and air conditions, and these are being closely studied.

Any major insect pest problem consists of a complex that requires the collaboration of specialists in many fields. If, for instance, it is one involving the use of insecticides it needs not only the economic entomologist but the biologist, the insect physiologist, the specialist in insecticide work, the chemist to assess deposits and possibly the physicist. Specialisation is necessary and inevitable but every effort should be made to develop team work in the attack on major problems.

Unfortunately there are two vital fields in which the effort has not kept pace with the advances that have been made in other fields. I refer to the study of taxonomy and biology. Although I believe this to be true of the entomological world as a whole, I shall confine my remarks to the British Commonwealth.

Let us take first of all taxonomy. For many years the study of taxonomy has been in the doldrums and in the past 40 years the advance that has been made has lagged far behind that in other fields. So serious was the position regarded by

the delegates to the Sixth Commonwealth Entomological Conference in 1954 that they recorded the view that the existing provisions for taxonomic research, and for identification services, was quite inadequate and that the work of the economic entomologists was, in consequence, being severely hampered.

It must be remembered that an Identification Service can only carry determinations so far as the existing knowledge of taxonomy permits. Many of the described pest species can be fairly readily determined, although in not a few cases confusion has arisen between closely allied species. Some, also, that have long been regarded as widespread and easily determinable are now being found to consist of complexes of closely related species. At the same time, specimens are continually being collected that cannot be named, either because they belong to species that have not been described or because the original descriptions are inadequate in the absence of type or authentic material. The parasitic Hymenoptera, for instance, present great difficulty to any Identification Service and activity in the field of biological control is being seriously hampered in consequence. The need to collate and revise previous work in order to provide the necessary framework into which new species can be correctly fitted is of paramount importance. No real improvement in general identification work is possible without it.

There are, also, very considerable gaps in our knowledge of the immature stages of the pest species and this renders it difficult to determine a species from such material. Until we know a great deal more than we do at present, we cannot help the entomologist in the field to recognise a species in the absence of the adult form. A knowledge of the real identity of a pest in the early stages may have far reaching results in enabling an incipient outbreak to be recognised and arrested.

In days gone by, circumstances were such that many enthusiastic amateurs were able to devote time and money to taxonomic research. But times have changed and taxonomy to-day calls for the same recognition and degree of support as that accorded to other fields. Unfortunately, this is not yet fully appreciated in official circles. The result is that throughout the British Commonwealth there is a serious shortage of taxonomists.

One of the reasons for the present inadequacy of taxonomic work is, as I have indicated, shortage of funds. Another is the competition to secure recruits from amongst the graduates as they leave the universities, and the relative scarcity of posts in the taxonomic field is not calculated to attract the young entomologist. In the past, the prospect of immuring oneself in a museum only commended itself to the very few. The outlook, however, is changing and it is becoming recognised more and more that it is extremely advantageous for a museum worker to have a spell overseas occasionally, either at some other museum or on a scientific expedition. No great advance, however, will be made until Governments can be persuaded of the urgency to provide the necessary funds for additional posts.

It must also be pointed out that, even with the comparatively limited number of taxonomists in the field to-day, the facilities for rapid publication of the results of research are woefully inadequate. It is most disheartening for the worker who has spent possibly years on a piece of important original taxonomic research to find difficulty in publication or to have to wait an inordinately long time before his results appear in print. If work in the taxonomic field is to be encouraged and increased it must be accompanied by improved facilities for publication.

I do not wish to weary you by going over the same ground as was covered when this subject was discussed in the 1954 Conference. Many of you were present at the time and will remember the constructive suggestions made by the Conference to meet the situation. Those of you who were not there will find a full report in the *Proceedings* of the Conference (1954).

There is, however, one additional suggestion that I should like to make. Every economic entomologist has some particular group of insects in which he is especially interested. I would urge each one of them to take up some small piece of taxonomic research in this group as a sideline. I know from experience the difficulties of working overseas with limited literature and paucity of reference material but I have always found specialists most willing to help fellow workers overseas faced with such difficulties. The hard core of queries that remain can be cleared up when the opportunity arises of visiting a centre where the necessary literature and reference collections are available. During my 23 years' service overseas I found that it was stimulating, and a help to me in my economic work, to have a little piece of taxonomic research to which I could turn in my spare time, or as occasion permitted. I recommend it to any young entomologist present who may be taking up an appointment overseas.

And now let us turn to the biological field. I am using biological here in the widest sense but excluding insect physiology. The study I have in mind is more the study of the insect in the field, its life history, habits, behaviour, ecology, influence of climatic and seasonal conditions. A thorough knowledge of these in respect of any insect pest is an essential prerequisite if an efficient and economic method of control is to be evolved. This is true whether chemical means, biological control or cultural measures are to be adopted. In the case of biological control it involves, of course, not only a study of the pest species but also of the parasite or predator to be introduced.

Where the insect is a well-known pest, the life history and habits, as well as the control measures, are probably to be found recorded in the literature. But even so the measures that have proved satisfactory in one country are not necessarily equally satisfactory in another; this may be due to a modification of the life history, habits or behaviour of the insect associated with local climatic or cultural conditions, or to some other factor.

An insect about which little or nothing is known may, however, on occasion assume pest proportions. Perhaps I may be permitted to quote an example from my own experience. Between the wars the fruit on three large citrus estates in Southern Rhodesia was being seriously blemished by the South African citrus thrips, *Scirtothrips aurantii* Faure, causing losses of export fruit up to as much as 50 per cent. The species was described by Faure as new to science in 1929 and virtually nothing was known about its biology. The traditional control for that type of insect at the time was to spray with lime sulphur. Several applications of such a spray had been given annually for two or three years without achieving satisfactory results. It is true that the application of the spray left something to be desired but the crux of the problem lay in the timing of the applications. It was found that if the spray was applied when the fruits were about $\frac{3}{4}$ cm. in diameter, before the thrips had moved from the young foliage on to the newly-set fruit, that a good kill of all but the eggs was obtained. The eggs being embedded in the plant tissue escaped but, as the duration of the egg stage was about eight and a half days, a second application nine days after the first caught a very high proportion of the newly-emerged nymphs. These two applications gave such a good kill that by the time, several weeks later, that the population began increasing again, the fruit was of such a size that virtually no injury was caused. So long as the thrips were confined to the foliage they were extremely difficult to find but when the population moved to the comparatively very restricted area of the young fruits, a relatively dense population resulted which caused a great deal of damage in a very short time. Applications of spray when the thrips and their damage became apparent were too late to be of any real value (Hall, 1930). Later it was found that by including colloidal sulphur in the lime sulphur

spray the secondary action was prolonged and a single application sufficed to give satisfactory control.

Whilst the life history and habits of a pest may be known, the behaviour of an insect and the effect of ecological conditions upon it are all too often very imperfectly understood. It is a study of these aspects that is often of such vital importance if efficient and economic control measures are to be devised. I should explain that by behaviour I have in mind such aspects as the effect of sunshine, rain or cloud on the movements of an insect, factors affecting population changes, a knowledge of the hour-to-hour position of an insect in its environment, the conditions associated with the choice of a site for oviposition, whether a fully-fed larva crawls down the trunk or drops off a tree to pupate, its association with other insects such as ants and so on. In our task of abstracting papers from the world literature on economic entomology at the Institute one is conscious of the fact that the behaviour aspect is the one most neglected in many of the otherwise excellent papers. Authors so often fail to give the very details that other workers would like to know and that might be of importance to them in the problems with which they are faced.

Every economic entomologist is aware of the necessity to carry out detailed studies of his insect pests and in this country a very great deal of excellent biological work is carried out in the various Research Stations and Universities. You will call to mind the biological work, including behaviour studies, on stored product insects; the biological work on fruit tree pests; the work on the problems of Aphid populations and activity; on factors concerned in host selection and host alternation, the colonisation of different species and of different parts of the plant; the biology of the Garden Chafer, behaviour in relation to population problems and so on. To quote an overseas example, a vast amount of work has been done in Africa over the past 50 years on the tsetse flies and a comprehensive account of the flies of the genus *Glossina* has been given in that classical monograph by the late Professor Buxton on *The Natural History of Tsetse Flies*.

Prior to 1914 the number of economic entomologists employed in the Departments of Agriculture of the Colonial Territories could almost be counted on the fingers of one hand. Even to-day they are extremely thin on the ground; a few of the larger territories have more than one entomologist but more often there is only a single such worker and several of the smaller Colonies have no-one at all. Yet their economies are largely dependent on agriculture and their production of raw materials is an important asset not only to themselves but also to the British Commonwealth. These Departmental Entomologists, where they exist, have to try and cope with the insect problems of a wide range of crops over an area often many times the size of this country, and they have no time to make detailed biological studies. At the same time when an outbreak of an insect pest threatens, the entomologist is expected to be able to make immediate recommendations for control. The urge to try out some of the new insecticides on a hit-and-miss basis is a natural outcome of this demand for quick results but, apart from being unscientific, it is entirely uneconomic.

So far as the Dominions and a very few of the larger colonies are concerned, biological and ecological studies might well be stimulated and augmented. Regional and commodity research stations also could give them higher priority. The locust field provides a good example of what can be done. When a locust invasion is in progress, the necessary control campaign occupies to the full all available staff in the territories affected. In the past very considerable sums of money have been voted to deal with such outbreaks. It was quite a different story, however, when no outbreak threatened and it was difficult to persuade Governments to provide funds for research, despite the fact that that was just

the time when such work should be carried out. That position was overcome by the establishment of the Anti-Locust Research Centre, under whose aegis basic research is constantly in progress, adding to the knowledge of this class of insects and to the factors having a bearing on their control.

Another example is afforded by the Colonial Termite Research Unit which combines a study of the biology and taxonomy of this class of insects.

The decision of the Colonial Office to form a small pool of Entomologists was prompted by the need to help those Colonial Territories which have not the necessary technical staff. The function of members of this pool is to make a detailed study of a specific pest and in the light of such study to make recommendations for control. These entomologists may be sent to any Colonial Territory to study a pest of major importance to its economy.

Schemes such as those I have quoted indicate what can be done, but a great deal more is necessary. Funds made available under the Colonial Development and Welfare Act have very greatly stimulated research work in the Colonies over the past 14 years but in any entomological scheme, whether it is financed wholly or in part from C.D. and W. funds or through other agencies, biological studies should receive top priority.

I would then make an earnest plea that we should get to know our insects better and for greater attention to be paid to detailed biological studies of insect pests and particularly of their behaviour and ecology, not only of those that attack growing crops and stored products but also of those that affect mankind and animals. This, I believe, would pay handsome dividends in saving much wasted effort and lead to more efficient and economical control measures.

I conclude my remarks, then, by saying that, in my view, our science has become unbalanced because the study of biology and taxonomy has not kept pace with the advances in other fields. I believe that it is of vital importance that the balance between the various branches should be re-established if the advances in one branch are not to be seriously retarded by the lack of fundamental information in others. It is a challenge to future progress in entomological science.

I am well aware that I have not told you anything this evening that is new to you. I make no apology for this because I feel that what I have said cannot be said too often. And all of you in your various spheres can do something to make the situation more widely recognised and thus help towards getting it rectified.

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PRINTED BY ADLARD AND SON, LIMITED,
BARTHOLOMEW PRESS, DORKING.